Commentary

Human Health and Environmental Health

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Physicians must get involved more deeply and more personally in combatting today's serious environmental problems. They need to recognize the health risks associated with continued environmental degradation. In medicine, if a promising drug proves to cause too severe side effects, its use is abandoned. As concerned humans, physicians must realize that human tinkering with the natural environment, regardless of the economic and material benefits, now threatens the healthy habitat of the human race. Let me describe the problems the world faces today.

We humans have not yet learned that everything on this earth we inhabit is interconnected, that every action we take has side effects, and that there's no such thing as a free lunch. The very improvements that we in our modern industrial society have made in the past 40 years have made us heedless and shuttered our eyes from dangerous reality. Consider our situation.

In the four short decades since 1950, the global economic product has nearly quintupled. On average, the global economic output of every decade since 1950 has matched the total economic output from the beginning of civilization to 1950. In these past four decades, the world's food crops have tripled, life expectancy has greatly increased, and both infant and child mortality have been reduced significantly. Many of the plagues of previous centuries have been conquered. Microscopic forms of life that threaten human life have been identified, and agents to destroy them have been developed. The art of surgery has been dramatically improved. Organ transplants now provide replacement for many worn-out or diseased human parts. Radiation, ultrasound, magnetic resonance, and even nuclear energy have become the tools of medicine.

Now, most of us in the industrial countries of the world live in incredible comfort, having at our disposal sophisticated energy systems, speedy transportation, the immediate exchange of information, an extraordinary choice of foods to eat, and the finest medical care the world has ever known. In fact, most of us live much better than did the royalty of a century ago, and the wealthy among us live more like gods.

So what's wrong?

In the same four decades that we came close to tripling our food crops, we lost nearly *one fifth* of the topsoil of our planet. In other words, in a very few years, we have paid for increased food production with precious topsoil that earth has been gathering for millions of years. We continue to lose topsoil at the rate of *24 billion tons* every year.

In these same four decades that our global economy quintupled, we have all but removed the old-growth trees in our temperate zone. In California alone, we have now reduced our virgin forests to just 5% of their original extent. Since 1950, we have also cut down a fifth of the tropical forests worldwide. As one side effect of this massive deforestation, we have lost an untold number of species of flora and fauna—in fact, tens of thousands of species—thus diminishing earth's biodiversity. As another side effect, we have significantly increased the carbon dioxide content of our air. We have also lost some 2% of the protective ozone layer in the upper atmosphere and far more than that in a hole over Antarctica, a hole that continues to grow in size every year. We may have seriously influenced our climate, as well, if global warming and bizarre weather patterns are any indication. (We know for a fact that global temperatures have increased by 0.6°C in the past 100 years, and computer models indicate that earth may be committed to a warming of another 1.5°C to 4.5°C in the next 40 years.)

We have been introducing increasing quantities of poisons and pollutants into the living space of our planet, into our air, our land, and our waters. Some of these poisons have been introduced deliberately—such as pesticides, herbicides, and other synthetic chemicals. In 1949 synthetic chemical production was practically new; between 1950 and 1985, however, the production of such chemicals as DDT and other pesticides, herbicides, food additives, industrial chemicals, plastics, and medical products increased almost tenfold, growing from an annual output of 24 billion pounds to an annual output of 225 billion pounds. The United States Toxic Substance Control Act lists more than 63,000 different chemical substances that have been used commercially in the United States in the past decade and a half—and new chemical substances are being introduced into this country at the rate of 1,500 per year. The worldwide production of chemical pesticides alone now comes to some *500 million pounds* a year. It is worth noting that only half of the insecticides now being produced ever reaches a crop and less than 1% ever reaches an insect.

There are numerous other poisons and pollutants that we have produced inadvertently, such as airborne wastes from industrial activities, ambient emissions from the combustion of fossil fuels, and chlorofluorocarbons that come from air

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conditioning, refrigeration, and spray cans. In fact, we have made a gigantic sink out of the air we breathe, pouring into it increasingly large quantities of sulfur, carbon, nitrogen, methane, and heavy metals—the exhausts and by-products of our technological societies. The Environmental Protection Agency (EPA) estimates that industry alone released into the air in one recent year (1987) *2.7 billion tons* of hazardous pollutants. This figure does not include the billons of tons of air pollutants released into the air by automobiles, which, incidentally, have increased in number worldwide by 72 million vehicles since 1970.

The vast chemical potion with which we are flooding our atmosphere is transported by winds and air currents over long distances. As it travels, it undergoes various reactions as one chemical acts on another. Solar energy and moisture in the air also enter into the process. The result is the mass production in our air of dangerous chemical compounds such as sulfuric acid, carbon monoxide, nitric acids, low-level ozone, and chlorofluorocarbons. Washed onto the land in deadly acid rain, these pollutants enter our water systems as well.

In just the past three decades, we have doubled the quantity of our noxious garbage and other solid wastes. We in the United States are also producing hundreds of tons of hazardous waste, more toxic and nuclear waste than any other country in the world.

During the past four decades, earth's human population has more than doubled. We are presently crowding more than 5.5 billion souls into earth's limited living space, and we continue to add 95 million people a year. While the populations of the industrialized countries can now live like kings (the people of the United States consume a fifth of the earth's resources that are consumed globally every year), some 1.2 billion of earth's peoples now live in absolute poverty.

These are facts that are coming slowly to the attention of people all over the world. But why are they of particular concern to physicians? Why should we care if the last of the old-growth forests are leveled, if the production of synthetic chemicals is going on apace, or if something around a quarter of the world's population is living in absolute poverty? We should and must care because we care about people, and we are concerned with the healthy survival of people. As things now stand, far too many millions of people are suffering from environmentally caused disease and disability, and if we continue to insult our environment as we are now doing, we stand to damage earth's life-support system to the possible destruction of human survival.

Take the matter of the loss of stratospheric ozone, to which the removal of forests contributes substantially. Although ozone in the lower regions of earth's atmosphere can be dangerous to human health, ozone in the upper atmosphere absorbs harmful wavelengths of ultraviolet radiation from the sun and so shields all of life on the planet from its effects, which in humans are carcinogenic. The reduction of atmospheric ozone may not only cause radical climate changes, it may have serious health effects; according to a recent study, the risk of melanoma developing in Americans has increased dramatically in the past few decades—from 1 in 1,500 in 1935 to 1 in 120 today. A projected increase suggests that the risk of melanoma will rise to 1 in 90 by the end of the century if present trends continue. Similar increases in melanoma are reported around the world—significantly among black and other dark-skinned populations who were once thought to be immune.

Then there is the matter of air pollution, which everyone deplores for its obvious effects on some of the world's most famous monuments, from the Parthenon to the Taj Mahal, from Gettysburg to the Mayan ruins. Air pollution increasingly threatens food crops all over the earth: 10% of total crop losses in the world are attributed to air pollution. It is being increasingly documented that air pollution causes not only short-term breathing difficulties but long-term lung disease. Recent studies indicate that high levels of air pollution are damaging not only to people with asthma but to those with normal lungs. Breathing the air in Mexico City is equated to smoking two packs of cigarettes every day—80% of the children living in that city suffer from respiratory problems. The EPA reports that at least 125 million people in the United States breathe unhealthy air.

And why, aside from the sympathy it engenders, is it of critical concern to physicians that about a fourth of earth's peoples live in absolute poverty? The diseases attendant on poverty can be devastating: chronic diarrhea, chronic bronchitis (often caused by smoke from unventilated cook stoves), ascariasis, increased infant mortality because of poor (or lacking) prenatal care—the list goes on. And overlooking how many of these 1.2 billion desperately poor people are painfully hungry, at least 400 million of them—two thirds of whom are children—suffer from serious malnutrition. A third of these children are doomed to die before they reach the age of 5.

Added to this burgeoning human population is that the more populous countries are those where malnutrition is on the march. Life expectancy rates are decreasing in at least nine African countries where the birth rates are skyrocketing. Infant mortality rates are creeping up in such countries as Brazil, Ghana, and Mexico. In recent years, we have witnessed the death by starvation of literally millions of people. Today the food output per capita is decreasing in even the developed countries, and our future food production is subject to an increasingly capricious climate.

And what about synthetic chemicals? Unquestionably there are synthetic organic chemicals that play major roles in controlling disease and in making life easier for us. But the deleterious, even lethal, side effects of many synthetic chemicals are being increasingly recognized. For example, of the 70,000 synthetic chemicals presently in world trade, about half, or 35,000, are considered to be definitely or possibly harmful to human health by the Organization for Economic Cooperation and Development. Certain pesticides, specifically, are known to cause miscarriages, birth defects, and other reproductive anomalies. On a broader scale, the United Nations Environmental Program reports that in 1987 there were more than 100 million cases worldwide of pesticide poisoning. At another level, over 90% of the substances listed as possible human carcinogens by the US National Toxicity Program are synthetic organic chemicals. So are 110 of the 126 toxic compounds found on the priority list of the federal Clean Water Act.

Physicians need to care that the earth's forests are being removed, not just for aesthetic reasons, although these are valid, too, but for reasons of human well-being. We need to protect our Arctic National Wildlife Refuge and our offshore waters, again not only for aesthetic reasons, but to preserve

earth's biodiversity and a healthy environment. We need to work for clean air and clean water and the safe disposal of toxic wastes for the health of human communities as well as for our own personal comfort and safety. We need to recognize that not only the dignity but the health of humanity is threatened by massive world poverty. It is incumbent on us as physicians to recognize and address the environmental health problems, which are, after all, our particular concern.

GENERAL REFERENCES

Brown LR, Flavin C, Postel S, et al: State of the World, 1990—A Worldwatch Institute Report on Progress Toward a Sustainable Society. New York, NY, WW Norton, 1990

Martin V (Ed): For the Conservation of Earth. Golden, Colo, Fulcrum, 1988

Observer. Am Coll Physicians 1990 Mar, vol 10

Speth JG: Environmental Pollution. Reprinted from Earth '88, Changing Geographic Perspectives. Washington, DC, National Geographic Society, 1988

World Commission on Environment and Development: Our Common Future. New York, NY, Oxford University Press, 1987

MEDICINE

The practice of medicine
Is not what it was
In my grandfather's time.

I remember him telling me
Of weeks that went by
When he would be paid
Only in chickens
Or only potatoes;

Of treating the families
Of striking miners
In Montrose or Telluride
Who could not pay at all;
Of delivering babies
(A total of twenty)
For a tribe of dirt farmers
Who paid one new-laid egg
Or a cup of spring water:

After sweating a breach birth
And twins at that,
At five in the morning
It was mighty good water.

When, fifty years later
He came back to the mountains
Middle-aged babies
Ran up in the street
Crying, Doc! Doc! eyes streaming,
Tried to kiss his old hands.

No, the practice of medicine
Is not what it was,
But it has its moments:

That morning in surgery
I regained consciousness
A little too early
And found the doctor
Kissing my hand,
Whispering, whispering,
It's all right, darling,
You're going to live.

for W.S., MD

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